PREVALANCE OF PERICARDIAL EFFUSION (PE) AND LEFT VENTRICULAR THROMBI (LVT) FORMATION FOLLOWING THROMBOLYTIC THERAPY WITH RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR, HEPARIN AND ASPIRIN IN ACUTE MYOCARDIAL INFARCTION PATIENTS.

Michael Motro M.D. F.A.C.C., Gad Keren M.D., Gabriel I. Barbash M.D. M.P.H., Hanoch Hod M.D., Arie Roth M.D., Mordechai Hochenberg M.D., Amir Shachar M.D., Shemuel Rath M.D., Hilton I. Miller M.D., Yadahai Har Zahav M.D., Eliezer Kaplinsky M.D. F.A.C.C., Sholomo Laniado M.D. F.A.C.C., from the Cardiology Institutes Sheba & Tel Aviv Medical Centers, Israel.

To evaluate the prevalence of pericardial effusion (PE) and left ventricular thrombi (LVT) after thrombolytic therapy 149 consecutive pts were prospectively studied with 2 D Echo on days 1 and 8 after admission. Pts were treated on average 2.1 ± 0.8 hrs after onset of symptoms. Thrombolytic protocol included rt-PA 120 mg/6 hr, heparin 5000 IU followed by continuous infusion of 25,000 IU/24 hr (for at least 5 days), and aspirin 250 mg/day. Pts fell into the following categories:

	TOTAL n=149	ANTERIOR n=75	INFERIOR n=74	P value
LVT	8 (5.3%)	6 (8.0%)	2 (2.7%)	NS
PE	12 (8.0%)	9 (12.0%)	3 (4.0%)	p=0.06

Apical LVT was more prevalent in the 20 pts with previous inferction as compared to pts without (4/20 vs. 4/129, p=0.01). LVT was present in 3 of 94 pts (3.1%) who upon hospital discharge had a radionuclide LVEF >50% and in 5 of 53 pts (9.4%) with LVEF < 50% (p =NS). In the entire group there were no manifestations of peripheral emboli during a six-month follow-up.
PE was was observed in 12/149 pts during the first 8 days after admission and was more prevalent in pts with anterior wall MI.
Conclusion; 1. Early thrombolytic therapy with rt-PA, heparin and ASA appears to reduce the frequency of LVT formation. 2. LVT is more prevalent in pts with previous inferction. 3. The incidence of PE during the 1st week in pts treated with the later protocol appears lower than that previously reported without thrombolytic therapy.

IN VIVO VALIDATION OF INTRALUMINAL ULTRASOUND CATHETER MEASUREMENTS USING SONOMICROMETERS AND QUANTITATIVE ANGIOGRAPHY.

Charles R. McKay, M.D., F.A.C.C., Linda Hahn, B.S., Daniel Nuno, B.S., Steven Fleagle, B.S.E.E., Richard E. Kerber, M.D., F.A.C.C., Melvin Marcus, M.D., F.A.C.C. Univ. of Iowa, Iowa City, IA.

Previous quantitative validation of intraluminal ultrasound (ILU) measurements has employed cadaveric arteries with potential fixation artifacts and use of dissected specimens. We performed validation studies in vivo in 5 in situ canine femoral artery specimens. We placed sonomicrometer crystals (SONO) across a femoral artery to measure total arterial diameter (TAD), an intraluminal real-time ultrasound catheter proximal to the crystals, and a catheter in the ipsilateral iliac artery for automated quantitative angiography (QA) to measure lumen diameter (LD) and lumen area (LA). Care was taken to leave the area of artery just proximal to the sonomicrometers undissected. ILU arterial images, QA, and SONO readings were obtained at control and after local intraarterial infusions of norepinephrine (NE, 50 μg/min), $PGF_{2\alpha}$ (100 μg/min), and acetylcholine (ACH, 80 μg/min). TAD by SONO ranged from 2.90 to 5.69 mm. LD by QA ranged from 2.06 to 4.98 mm. Correlations were as follows (n=number of data points):

	n	Slope	Intercept	r
TAD (SONO vs. ILU) mm	25	0.81	0.79 mm	0.91
LD (QA vs. ILU) mm	15	1.06	-0.35 mm	0.96
LA (QA vs. ILU) mm^2	15	0.90	-0.90 mm^2	0.90

We conclude that arterial dimensions can be accurately measured in vivo by ILU after pharmacologic interventions under realistic conditions.

Monday, March 19, 1990
2:00PM–3:30PM, Room 14
Intravascular Imaging I

REALTIME INTRACARDIAC TWO-DIMENSIONAL ECHOCARDIOGRAPHY IN THE CATHETERIZATION LABORATORY IN HUMANS

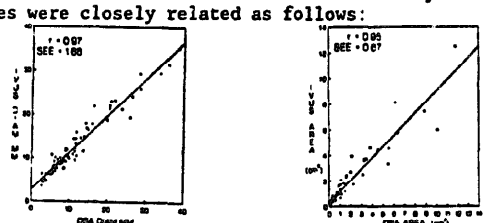
Andrew Weintraub MD, Natesa Pandian MD, FACC, Deeb Salem MD, FACC, Steven Schwartz MD, Marvin Konstam MD, FACC, Vic Millen MD. New England Medical Center, Tufts Univ School of Med, Boston, Mass.

We and others have previously shown the capability of obtaining cross-sectional images of arteries by intravascular ultrasound in humans. In this study we explored the practicality of *intracardiac* 2-D echocardiography in conscious humans. In 12 patients who underwent diagnostic catheterization, we advanced a 20 MHz transducer tipped ultrasound catheter (IVUS) into the right heart (RH) via the femoral or jugular veins and into the left heart (LH) retrograde via the femoral artery, and obtained realtime dynamic 2-D images of various cardiac structures. As the catheter was advanced or withdrawn, SVC, IVC, and aorta in their entirety were well visualized. Advancing it into the RH, we were able to image the RA wall, and tricuspid valve, and engage the coronary sinus and get circumferential coronary sinus images. With the catheter in RV, RV myocardium and the pulmonic valve could be visualized. In the LH, we were able to image the aortic valve, LV outflow region and LV free wall. In one pt who underwent transseptal catheterization, we were able to advance the ultrasound catheter into the LA, and across a stenotic mitral valve into the LV. We obtained images of the LV, thickened mitral valve, LA wall, and atrial septum. With the catheter in major chambers, the whole chamber could not be visualized because of the limited depth of field. However in all patients, the catheter location in various RH and LH regions could be predicted based on ultrasound images without looking at flouroscopy. Advancement into various cardiac chambers was possible with appropriate manipulation of both blunt-tipped and over-the-wire ultrasound catheters. The average time required for imaging the RH and LH structures was 8 minutes. There were no complications. This experience indicates that realtime intracardiac two-dimensional echocardiography is feasible in humans, is safe, and it provides high resolution images of various cardiac structures. This new imaging approach may have important diagnostic, guiding and monitoring applications in the invasive cardiac laboratory.

INTRAVASCULAR ULTRASOUND VERSUS DIGITAL SUBTRACTION ANGIOGRAPHY: A HUMAN *IN VIVO* COMPARISON OF VESSEL SIZE AND MORPHOLOGY.

Charles J. Davidson MD, Khalid H. Sheikh MD, J. Kevin Harrison MD, Stevan I. Himmelstein MD, Mark E. Leithe MD, Katherine Kisslo RDMS, Thomas M. Bashore MD FACC. Duke University Medical Center, Durham, North Carolina

The in vivo accuracy of catheter-based intravascular ultrasound (IVUS) to define lumen size and its sensitivity to describe lesion morphology have not been previously reported. Vessel diameter, cross-sectional area, and lesion characteristics assessed by digital subtraction angiography (DSA) and IVUS (6.5 F, 20 MHz) were compared in 74 human arterial segments. The same arterial segments were imaged and analyzed by DSA and IVUS at 48 femoral, 3 renal, 7 pulmonic, and 16 aortic sites. Arterial lumen measurements by both techniques were closely related as follows:



Of the 20 sites of atherosclerotic plaque identified by IVUS, 6 segments appeared normal by DSA. Conversely, DSA identified irregularities in 18 segments, of which 4 appeared normal by IVUS.

These data indicate there is an excellent correlation between IVUS and DSA for in vivo measurement of human arterial dimensions. However, intravascular ultrasound is more likely to identify atherosclerotic plaque that may be angiographically "silent."